

ICS 77.120.30
CCS H 13

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**NONFERROUS METALS INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YS/T 990.6-2014

**Methods for chemical analysis of copper matte. Part 6:
Determination of lead content. Atomic absorption spectrometry
and Na₂EDTA titration method**

冰铜化学分析方法 第6部分：铅量的测定原子吸收光谱法和Na₂EDTA滴定法
(English Translation)

Issued on: October 14, 2014

Implemented on: April 1, 2015

Issued by: Ministry of Industry and Information Technology

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Foreword

YS/T 990 "Methods for chemical analysis of copper matte" is divided into 18 parts.

- Part 1. Determination of copper content iodometry;
- Part 2. Determination of gold and silver atomic absorption spectroscopy and fire assay;
- Part 3. Determination of sulfur content - Gravimetric method and combustion titration method;
- Part 4. Determination of the amount of bismuth atomic absorption spectrometry;
- Part 5. Determination of the amount of fluorine ion selective electrode method;
- Part 6. Determination of lead content - Atomic absorption spectrometry and Na₂EDTA titration;
- Part 7. Determination of cadmium content - Atomic absorption spectrometry;
- Part 8. Determination of arsenic content by hydride generation - atomic fluorescence spectrometry, diethyl dithiocarbamate spectrophotometry silver and potassium bromate titration;
- Part 9. Determination of iron content dichromate method;
- Part 10. Determination of silicon dioxide content molybdenum blue spectrophotometric method and silicon potassium fluoride titration;
- Part 11. Determination of the amount of nickel atom absorption spectrometry;
- Part 12. Determination of the amount of chromium oxide of aluminum Azure S Spectrophotometry;
- Part 13. Determination of magnesium oxide content - Atomic absorption spectrometry;
- Part 14. Determination of the amount of zinc atomic absorption spectrometry and

Na₂EDTA titration;

--- Part 15. Determination of antimony content - Atomic absorption spectrometry;

--- Part 16. Determination of mercury content - Cold atomic absorption spectrometry;

--- Part 17. Determination of the amount of cobalt atomic absorption spectrometry;

--- Part 18. lead, zinc, nickel, arsenic, bismuth, antimony, calcium, magnesium, cadmium, cobalt content - Inductively coupled plasma atomic emission spectrometry.

This section YS/T Part 6 990.

This section drafted in accordance with GB/T 1.1-2009 given rules.

The non-ferrous metal part by the National Standardization Technical Committee (SAC/TC243) centralized.

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1 Scope

This section YS/T 990 specifies the method for determination of lead content in matte.

This section applies to the determination of copper ice lead content. Method 1 Measuring range. 0.20% - 5.00%; Method 2 measurement range. 5.00% ~ 10.00%.

2.1 Method summary

Sample by ammonium hydrogen fluoride, hydrochloric acid, nitric acid and bromine decompose in dilute nitric acid medium, using air - acetylene flame atomic absorption spectrometer wave Long lead absorbance measured at 283.3nm.

2.2 Reagents

Unless otherwise indicated in the analysis using only recognized as analytical grade reagents and distilled or deionized water or equivalent purity.

2.2.1

hydrochloric acid ($\rho = 1.19\text{g/mL}$).

2.2.2

nitric acid ($\rho = 1.42\text{g/mL}$).

2.2.3

nitric acid (11).

2.2.4

perchloric acid ($\rho = 1.67\text{g/mL}$).

2.2.5

Ammonium hydrogen fluoride (saturated solution).

2.2.6

bromine.

2.2.7

Lead standard stock solution. Weigh 1.2500g metallic lead ($w_{\text{Pb}} \geq 99.99\%$) in 250mL conical beaker, add 30mL of nitric acid (2.2.3), cover the surface of the dish low dissolved completely, add 25mL of nitric acid (2.2.3), diluted with water to 500mL volumetric flask, and mix. at this time 1mL 2.5mg solution containing lead.

2.2.8

Lead standard solution. Pipette 10mL lead standard stock solution (2.2.7) in 100mL flask, add 10mL of nitric acid (2.2.3), Dilute with water to volume, and mix. This solution 1mL containing 250 μg lead.

2.3 Instruments and equipment

Atomic absorption spectrometer, with a lead hollow cathode lamp.

Under optimum working conditions for those who can reach the following indicators can be used.

--- Characteristic concentration. a solution in the measurement matrix consistent solution, characteristic concentration of lead should be less than 0.048 $\mu\text{g/mL}$.

--- Precision. standard solution with the highest concentration of 11 times the absorbance measurements, the standard deviation should not exceed the average absorbance of 1.0%;

The lowest concentration of standard solution used (instead of "zero" concentration of the standard solution) 11 measuring the absorbance, which should not exceed the standard deviation 0.5% high standard solution absorbance.

--- Linear curve. the curve according to concentration, divided into five sections, the absorbance difference between the highest and the lowest segment absorbance difference the ratio shall be not less than 0.85.